

## ABSTRACT

A method of preparing semiconductor nano crystal anatase  $\text{TiO}_2$  solution uses titanium alkoxide  $\text{Ti(OR)}_4$  as a main component in combination with chelating agents in aqueous solution. A fluorescent lamp tube is coated with the semiconductor nano crystal anatase  $\text{TiO}_2$  solution to form a photocatalytic coating fluorescent lamp capable of cleaning air. Then a baking step is carried out at a low temperature about  $100\text{-}250^\circ\text{C}$ . By doped anatase  $\text{TiO}_2$  with small amount about 0-1.0 wt% of precious metals complex or transition metals oxides as nano-particle on or in the anatase  $\text{TiO}_2$  nano-particle surface, the visible light photocatalysis efficiency is increased for air cleaning. By doped with small amount  $\text{Eu}^{+3}$  or rare earth metal ion on or in the anatase  $\text{TiO}_2$  nano-particle surface, which is a photocatalytic material acting as fluorescent agent, the fluorescent lamp has increasing brightness of when it is turned on.